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PUBLIC INVESTMENT IN TRANSPORT: A TEST
OF THE HICKS-KUBISCH THESIS FOR SAUDI ARABIA

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PUBLIC INVESTMENT IN TRANSPORT: A TEST
OF THE HICKS-KUBISCH THESIS FOR SAUDI ARABIA (*)

R.E. LOONEY(**)

ABSTRACT: Because of the falling oil revenues throughout the 80's, Saudi Arabia, as most of the OPEC countries, was forced to introduce fiscal austerity programs. However, little is known about the criteria followed in setting expenditure priorities, particularly with reference to the transportation and communication sector. The paper deals with issues such as: how the Saudi Arabian authorities revised their allocations to the major budgetary categories following revenue developments during the fiscal year; the topic of supposed systematical unanticipated changes in revenues; the related issue of which categories gained or lost; and finally the possible insights as to the strategy followed by the government in setting budgetary priorities.

INTRODUCTION

Throughout the 1980s Saudi Arabia, experienced a period of relative fiscal austerity. Falling oil revenues forced a number of significant budgetary cutbacks. However, by early 1989 the situation had stabilized to the point that the Saudi Arabian government announced that its 1989 budget would be equal to that of 1987 — SR 140 million. To many observers, this signaled a welcome end to the deflationary effects of successive reductions in government budgetary expenditures over the last few years. In practice, it allowed ministries to prepare sufficient projects for implementation in the event that revenue constraints did not force cutbacks during the year (Economist Intelligence Unit, 1989).

While most of the OPEC countries were forced to introduce similar austerity programs, little is known about how these governments set priorities for their shrinking revenues between major expenditure categories, and in particular the transportation and communications sector. The purpose of this paper is to address this issue. In particular, we are interested in determining the manner in which the Saudi government revised, in light of revenue developments during the fiscal year, its allocation to the major budgetary categories. Did expenditures on certain categories vary systematically with unanticipated changes in revenues? If so, which sectors gained? Lost? Do these patterns provide insights as to the manner in which the government established budgetary priorities during this period?

COMPOSITION OF THE BUDGET

As noted above relatively little is known about how OPEC governments make expenditure decisions as to what programs to cut back during periods of austerity. For the non-OPEC countries, anectdotal evidence suggest that officials follow rather *ad hoc* rules from making large contractions in a short period of time—cutting new rather than on-going projects, new rather than present employment, materials and travel expenses rather than personnel, and favoring ministries that are politically powerful or reducing those that have expanded most rapidly in the past (1). Some sectors are often thought to be more vulnerable than others to reductions; social sectors in particular are usually considered more and defense sectors less prone to budgetary cuts.

As to the choice of which sectors to cut back, it is often felt that some sectors are more "vulnerable" than others to reductions. The defense sector, particularly, is usually considered difficult to reduce, while other sectors, particularly the social sectors such as health, education and rural development are considered vulnerable. The alleged vulnerability of the social sectors in non-OPEC countries is clearly evident in World Bank documents:

> In the difficult past few years, budgetary crises have often meant that social services were cut back, in the process unraveling carefully designed programs. (The World Bank, 1983 (b)).

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(1) Cfr. the discussion in N. Caiden and A. Wildavsky, 1974.

Since many human development programs are publicly funded, they are especially vulnerable when growth is threatened and budgets are under pressure. The recurrent costs of social programs, especially salary costs, tended to make them a permanent and, therefore, vulnerable part of government budgets (The World Bank, 1981).

Quick fix relief through disproportionate cutbacks—in, for example, education or rural development—may well have negative consequences for the entire economy (The World Bank, 1983 (a)).

Many member countries have had to reduce and reorient investment programs to curtail recurrent expenditures and to delay the completion of high priority development projects. Programs in health, education and other social sectors have been particularly vulnerable (The World Bank, 1984).

In the crisis situations confronting African governments, education, training and health programs are continuously in danger of becoming the residual legatees of both resources and of attention by policy makers (The World Bank, 1983 (c)).

Despite these rather strongly held views, little empirical investigation has been made concerning the budgetary vulnerability of individual sectors. In the most comprehensive study to date Hicks and Kubisch (1984) examined 37 cases of budgetary reductions. These were defined as occurring in countries where real expenditures declined in one or more years. According to Hicks and Kubisch, a sector was defined as:

1. Well protected if expenditures on it were reduced by less than the percentage reduction in total expenditures.

2. Vulnerable if its percentage of reduction exceeded the average.

In brief, a simple ratio of percentage changes in each sector's expenditures relative to total spending served as the measure of vulnerability. Where the ratio had a greater value than one, it indicated that the sector was highly vulnerable; a value between zero and one indicated low vulnerability, with less than proportional reductions in the relevant sector. A negative value indicated that despite overall expenditure reductions, the sector was allowed to expand.

Hicks and Kubisch main findings (Table 1) indicated that the countries examined experienced an average decline of 13% in real government

expenditures. Associated with this decline was a contraction of only 5% in the social sectors (producing a vulnerability index of 0.4). By contrast, the index was 0.6 for administrative/defense sectors and over 1 percent for production and infrastructure. In short, the various social sectors were less vulnerable to cuts than defense and administration which in turn were considerably less vulnerable than production and infrastructure, contrary to the generally accepted view.

The fact that social sectors and defense were both relatively protected suggests that there were high political costs associated with reducing them. On the other hand, countries appeared to have been more willing to cut spending

TABLE 1

Impact of Reduction in Government Expenditures

Expenditures Category

	Social	Defense/ Admin	Production	Infrastructure	Miscell.
Average % change in real expenditures	- 5	- 8	- 11	- 22	- 7
Index of Vulner- ability	0.4	0.6	1.2	1.7	0.8
Low Income	0.2	0.9	0.6	1.2	0.5
Middle Income	0.5	0.4	1.7	1.9	1.1

Source: Norman Hicks and Anne Kubisch, "Cutting Government Expenditures in LDCs " Finance and Development (September 1984), p. 38.
Note: Capital and recurring expenditures for 32 developing countries for various periods during 1972-80.

on infrastructure and production. The net result of which had adverse implications for longer-term growth prospects but fewer early, direct and immediate political costs.

These conditions were not very different for countries belonging to different income groups. The low income countries (Table 1) appear to have afforded slightly more protection to the social sectors and production and slightly less to administration and defense, but the difference was marginal. The middle income countries, by contrast, gave more protection to administration and defense and less to productive and infrastructural sectors.

The apparent bias toward maintaining expenditures in the social services and defense may reflect the government's preference for present consumption over investment and future consumption, since social sectors and defense typically have a heavy bias toward recurrent expenditures and within these there is a sizable employment component. Since the social sectors and defense/ administration are relatively labor intensive with high recurrent costs, reducing expenditures on them not only cuts back services highly valued by the public, but also causes relatively high unemployment per unit reduction.

The manner in which government deals with austerity seems to hold up fairly well for the Saudi Arabian case. In recent years, there has been a general shift from public investment towards public consumption (Table 2). Within this fiscal environment, all the major categories of the budget have been cut (Table 3). Infrastructure spending in particular has been cut drastically, with few new projects commissioned. The budget for education and health has also been cut, reflecting in part a decline in capital expenditure on new schools and hospitals. The wage bill for teachers, nurses and doctors continues to rise, however. Similar conditions arise with defense expenditures; even though as basic defense infrastructure is past its peak, the need to purchase new equipment and to maintain existing systems is still great (Wilson, 1987).

In terms of specific allocations (Table 3):

1. Government lending institutions have experienced the greatest reduction in their allocations, declining by 51.9 percent over the 1983/88 period, and with cutbacks accelerating to 67.5 percent for the more recent 1985/88 period.

2. After expanding at an average rate of 20.6 percent over the period following the second oil price increase (1980-82), human resource development averaged reductions of 5.8 and 8.0 percent per annum over the 1983-88 and

TABLE 2

Saudi Arabia: Public/Private Sector Expenditure Patterns, 1979-1988

(Percentages)	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
(Percentage of Gross Domestic Product)										
Public Expenditures	48.4	27.5	37.2	48.3	50.5	47.7	46.8	48.5	49.0	42.6
Public Consumption	28.8	15.7	24.5	30.5	32.6	34.5	36.4	39.2	39.1	32.7
Public Investment	19.6	11.8	12.7	17.8	17.9	13.2	10.4	9.3	9.9	9.9
Private Expenditures	35.3	26.5	29.6	45.1	51.5	56.9	61.7	63.5	60.0	59.0
Private Consumption	27.5	22.1	24.1	36.4	42.3	45.3	50.5	51.7	49.2	49.1
Private Investment	7.8	4.5	5.5	8.6	9.2	11.6	11.2	11.8	10.8	9.9

Source: Computed from: Saudi Arabian Monetary Agency, Annual Report, various issues. Note: Government expenditures for 1987 are given as 137, 422.

1985-88 period respectively. It appears, however, that of the major budgetary categories, human resource development experienced the smallest cutbacks during the 1983/88 period, and over the 1985/88 period.

3. Despite the common perception of their high priority, defense expenditures

TABLE 3

Saudi Arabia: Central Government Budgetary Expenditures: 1980-88

(Billions of Saudi Riyals)

Category	1980	1983	1985	1988	Average Annual Rate of Growth		
					1980/ 1983	1983/ 1985	1985/ 1988
Human Resource Development	18.2	31.9	30.4	23.7	20.6	-5.8	-8.0
Transportation & Communications	24.4	32.5	22.2	10.9	10.0	-6.1	-21.1
Economic Resource Dev	14.9	22.0	12.5	5.9	13.9	-23.1	-22.1
Health	9.8	17.0	16.1	10.8	20.2	-8.7	-28.5
Infrastructure	6.9	11.7	9.8	3.6	19.3	-21.0	-28.4
Municipal Services	12.7	26.2	17.1	7.0	27.3	-23.3	-25.7
Defense	56.5	92.9	79.9	50.1	18.0	-11.6	-14.4
Pub Administ.	48.0	44.6	43.9	25.1	-2.4	-10.9	-17.0
Govt Lending Institutions	24.8	23.4	17.5	0.6	-1.9	-51.9	-67.5
Local Subsidies	0.0	11.2	10.5	5.3	- -	-13.9	-20.4

Notes: Based on data from: Saudi Arabian Monetary Agency, Annual Report, various issues.

contracted at the fairly rapid rate of 11.6 and 14.4 percent per annum over the 1983/88 and 1985/88 periods.

4. The same also applies to local subsidies which have declined at 13.9 and 20.4 percent per annum during the 1983/88 and 1985/88 periods respectively.

As a result of these differential rates of contraction, the relative shares of the major expenditure items have undergone a fairly large realignment (Table 4).

TABLE 4

Saudi Arabia: Composition of Central Government Budget 1980-88

(Percent of Central Government Expenditures)

Category	1980	1982	1984	1985	1986	1987	1988
Human Resource Development	8.5	8.8	10.7	11.7	12.3	14.8	16.6
Transportation Communications	11.3	11.9	9.6	8.5	7.2	6.8	6.7
Economic Resource Dev	6.9	7.6	5.1	4.8	4.5	4.1	4.2
Health	4.6	4.6	5.2	6.2	6.4	7.0	7.7
Infrastructure	3.1	4.7	3.7	3.8	3.5	2.7	2.5
Municipal Services	5.9	8.8	7.3	6.6	5.9	5.1	5.0
Defense	26.1	27.7	29.0	30.7	32.0	34.0	35.5
Pub Admin.	22.2	14.4	18.2	16.9	19.8	19.4	17.8
Govt Lending Institutions	11.5	8.3	7.7	6.7	4.7	2.2	0.4
Local Subsidies	0.0	3.1	3.5	4.1	4.2	3.9	3.8

Notes: Based on data from: Saudi Arabian Monetary Agency, Annual Report, various issues.

1. There has been a major increase in human resource development, from 8.5 percent of government expenditures in 1980 to 16.6 percent in 1988. Again this increase reflects more the contraction of human resource expenditures at a rate considerably less than experienced by other major categories.

2. Defense expenditures have maintained their dominant position increasing from around twenty-six percent of the budget in 1980 to over thirty-five percent by 1988.

3. Government lending institutions have experienced a dramatic decline in importance, experiencing a decline in their share of government expenditure. This fell from over 11 percent (1980) to less than a half percent (1988).

4. Infrastructure expenditures in 1988 were about one half their 1980 share.

5. A similar percentage decline was experienced by transportation and communications.

Human resource expenditures have enabled the country to achieve significant increases in both enrollment rates and teacher student ratios. Although the country lags somewhat behind comparable countries in terms of enrollment rates, it appears to be closing the gap fairly quickly. In addition, the pupil teacher ratio is one of the lowest ones in the region.

On the other hand, the relatively low number of pupils reaching the sixth grade (The World Bank, 1989) indicates that a number of difficulties exist in terms of perhaps the quality of education received. It is clear that the country has made some great strides in its efforts to increase the kingdom's stock of human capital. However, it is just as apparent that a great deal more needs to be accomplished.

OPERATIONAL DEFINITIONS

The evolving budgetary patterns examined above are suggestive of the manner in which the Saudi Government sets priorities for its expenditure. However, simple comparisons in the relative growth of budgetary allocation to individual sectors (or their share of the total) while suggestive, are not sufficient in and of themselves to infer the existence of any particular pattern of budgetary priorities. These measures fail to capture the dynamics of the budgetary process.

While the government's fiscal position provides an insight into the public

sector's budgetary priorities, a more sensitive and indicative indicator is the manner in which the government uses the deficits (Table 5) to fund or reduce allocation to certain budgetary categories. Three types of deficits are relevant:

(a) *Actual Deficits*— those that actually occur during the budget period. Here deficits are defined as the difference between government expenditure and government revenues (2).

(b) *Expected Deficits*—those anticipated at the beginning of the fiscal year i.e. the difference between anticipated expenditures and forecasted revenues.

(c) *Unexpected Deficits*—changes in the public sector's budgetary position, defined as the difference between the actual deficit in any year and the one that was expected to occur at the beginning of the fiscal year.

Here we assume that expected deficit reflects a structural imbalance between revenues and expenditures. Similarly, transitory government deficits are assumed to be depicted by that component of the public deficit that was unexpected. Clearly, the basic assumption underlying these proxies is that the expected deficit represents an on - going budgetary process that moves slowly over time and cannot be changed very rapidly.

Given the aversion of the Government to run deficits (Looney, 1990), the relationship between a sector's budgetary share and the government's fiscal position (revenues minus expenditures) in any year should be indicative of the priority accorded that sector. More specifically, the Government is willing to run deficits only for the purpose of funding high priority expenditures. The shares of these budgetary categories would therefore be expected to increase during periods of growing budgetary deficits. Similarly, their budgetary shares should decrease during periods of growing budgetary surplus—that is during times when the government has ample funds to allocate to lower priority activities.

Incorporating these elements into a model of budgetary priorities (with expected signs for high priority categories in parenthesis) yields:

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(2) This definiton of the deficit makes it easier to interpret the empirical results presented in Tables A-1 through A-5. That is since an increase in the deficit has a positve sign, we can easily determine which budgetary categories owe their increased budgetary share to the governments willingnesss to run a higher deficit. Likewise we can determine which budgetary categories are vulnerable to cutbacks associated with a growing fiscal deficit.

TABLE 5

Saudi Arabia: Budgetary, 1979-1988

(Percentages)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
(Percentages of Gross Domestic Product)										
Expected Deficit	0.0	4.4	21.3	10.1	0.0	10.0	14.7	0.0	19.1	12.7
Actual Deficit	6.6	-4.9	-21.3	-20.7	-0.3	6.8	14.3	18.6	32.1	24.7
Unanticipated Deficit	6.6	-8.8	-42.5	-30.2	-0.3	-3.2	-0.4	18.6	13.0	12.0

Source: Computed from: Saudi Arabian Monetary Annual Report, various issues. Notes: Government expenditures for 1987 are given as 137,422 million riyals for the first ten months of the year. This figure was proportioned up to 164,906 million riyals for a twelve month period. The same was done for revenues. The deficit is computed as expenditures minus revenues. Therefore a positive figure indicates a deficit has occured.

(A) BUDGETARY SHARE = [DEFU,   DEFA,   DEFB,   GOVEE]
                        (+)   (+)   (-)   (+)

Where:

DEFU = the unexpected budgetary deficit

DEFA = the actual budgetary deficit

DEFB = the expected budgetary deficit

GOVEE = expected government expenditures

In terms of indices of budgetary priorities, we hypothesize that the unanticipated deficit should be the most indicative measure of the priority afforded a budgetary category. During the fiscal year additional (emergency) borrowing would likely only be used to assure adequate funding of the government's most important programs. The actual deficit is less volatile, and therefore would be next in importance as an indicator of priority. The expected deficit provides an initial benchmark measure of budgetary priorities.

This form of prioritizing is consistent with (although not proof of) some form of lexicographic (Encarnacion, 1970) ordering of budgetary priorities. That is the government tries to maintain certain budgetary categories at pre-defined levels. When these levels are met, the authorities are then willing to provide additional funding for categories and programs of lower priority.

The expected level of government expenditures was entered as a control variable. That is as the share of government expenditures in GDP (Gross Domestic Product) increase, do certain budgetary categories tend to systematically have their budgetary shares increase. This is the so called Wagner's Law (3) effect whereby countries allocate a higher proportion of their resources to certain public goods (usually defense) with the general expansion of the government in the economy.

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(3) For a description of this effect together with empirical evidence see Robert E. Looney, *Third World Military Expenditure and Arms Production* (London: Macmillan, 1988), chapter 5.

RESULTS

Because of the limited number of observations, the available degrees of freedom did not permit the estimation of the full model described in Equation A above. Instead, a series of regressions were estimated utilizing sets of two of the independent variables. This method had the advantage of testing for the consistency and robustness of results—i.e. were the independent variables statistically significant across a number of alternative specifications?

The main results are presented in Tables A-1 through A-5 and summarized in Table 6. They provide a number of important insights concerning Saudi

TABLE 6

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Summary of Main Findings by Budgetary Category

(standardized regression coefficients)

Budgetary Category	Fiscal Measure			
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues
Transportation and Communications	-	ins	-	+
Infrastructure	-	ins	-	+
Economic Service	-	ins	-	+
Human Resource Development	+	ins	+	ins
Health and Social Development	+	ins`	+	ins
Municipal Services	ins	ins	ins	+
Defense	ins	ins	ins	+
Government Lending	ins	-	-	+
Administration	ins	ins	ins	ins
Subsidies	ins	ins	ins	ins

Note: Based on Tables A-1 through A-5. + = positive and consistently statistically significant at the 95 percent level; - = negative and consistently statistically significant at the 95 percent level; ins = insignificant at the 95 percent level.

Arabian budgetary priorities and, in particular the effect of budgetary shortfalls on allocations to transportation and communications:

1. As anticipated transportation and communications suffered (along with infrastructure and economic services) major cutbacks during periods of unexpected increases in the government deficit. These sectors were also quite vulnerable to reductions when the actual deficit increased.

2. Further evidence that these sectors had a low priority during the 1980s stems from the fact that their expansion was largely a function of increases in expected revenues. That is only after other budgetary categories received funding from the deficits, were these budgetary categories funded due to rising expectations concerning oil revenues.

3. Human resource development and health and social development were the only budgetary categories to have their budgetary shares increase with expanded unanticipated deficits. They were also the only sectors to have their budgetary shares increase during periods of increased actual (realized) budgetary deficits.

4. Human resource development and health did not have their budgetary shares expanded with increases in expected revenues. This finding is consistent with the notion that because of their high priority their funding levels were assured. Given this marginal increases in revenues could be safely used by the authorities to fund lower priority projects.

5. The deficit-related expansion in human capital seems to have come in part at the expense of longer term investments in economic capacity. Specifically: (a) transportation and communications, (b) economic services and (c) infrastructure all had their budgetary shares contract during periods of increased unexpected and actual deficits. This finding is consistent with the findings of Hicks and Kubisch noted above.

In general the main findings confirm the unwillingness of the Saudi govenment to fund longer term projects during periods of budgetary austerity. Instead, on-going projects in the social area were relatively protected during the period of austerity and budgetary contraction in the 1980s.

CONCLUSIONS

As a result of the Gulf War, together with increasing worries concerning internal security, one might correctly assume that defense spending would have been a higher priority than ever before in Saudi Arabia. While defense has retained its leading share of the budget during the recent period of relative fiscal austerity, the country does not appear to have fallen into the guns versus education syndrome. In fact the two types of expenditure appear to complement each other in the minds of the Saudi budgetary authorities.

While the country appears firmly committed to its responsibility of providing educational opportunities to the majority of its citizens, there is reason for concern. The relative neglect of the transport/communication sector (along with economic services and infrastructure) mean that there will be a general erosion of the productivity of Saudi graduates unless the government addresses the country's growing imbalance between physical and human capital. Fortunately, the results above suggest that the government's recently improved revenue position will be used to expand investment in the nation's transport system.

TABLE A-1

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Transportation and Communications, Economic Services

(standardized regression coefficients)

Category

	Fiscal Measure				Statistics	
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues	R^2 (adj)	F
Transportation and Communications						
(1)	-0.76 (-3.29)				0.512	9.4
(2)	-1.08 (-6.01)	-0.63 (-3.24)			0.793	16.3
(3)		-0.20 (-1.25)	-0.92 (-6.01)		0.795	16.4
(4)			-0.63 (-4.95)	0.41 (3.03)	0.894	34.7
(5)	-0.57 (-5.94)			0.61 (6.14)	0.919	46.2
Economic Service						
(6)	-0.80 (-3.64)				0.554	10.9
(7)	-1.09 (-6.36)	-0.60 (-3.24)			0.811	18.1
(8)		-0.17 (-1.12)	-0.92 (-6.36)		0.813	18.2
(9)			-0.69 (-5.09)	0.35 (2.48)	0.887	32.4
(10)	-0.61 (-5.67)			0.56 (5.08)	0.901	37.5

Notes: Equations estimated with a Cochraine-Orcutt iterative procedure to correct for serial correlation; R^2(adj) is the adjusted (for degrees of freedom) coefficient of determination; F is the F-statistic; ( ) is the t-statistic of significance. All variables are defined in terms of their percentage of total (actual) government expenditures. The unexpected deficit is the difference between the actual deficit and that projected at the beginning of the fiscal year. Expected expenditures are those projected at the beginning of the fiscal year. The deficit is defined as expenditures minus revenues. Positive numbers therefore signify that a larger deficit increases budgetary shares.

TABLE A-2

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Infrastructure, Municipal Services

(standardized regression coefficients)

Category

	Fiscal Measure				Statistics	
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues	R^2 (adj)	F
Infrastructure						
(1)	-0.66 (-2.33)				0.484	8.5
(2)	-1.11 (-3.92)	-0.57 (-2.45)			0.699	10.3
(3)		-0.14 (-0.77)	-0.94 (-3.92)		0.700	16.5
(4)			-0.60 (-3.19)	0.47 (2.75)	0.848	23.3
(5)	-0.53 (-4.20)			0.66 (5.46)	0.896	35.4
Municipal Services						
(6)	-0.42 (-1.27)				0.295	4.3
(7)	-0.95 (-3.05)	-0.70 (-2.63)			0.616	7.4
(8)		-0.32 (-1.56)	-0.81 (-3.06)		0.615	7.4
(9)			-0.33 (-1.64)	0.66 (3.56)	0.822	19.5
(10)	-0.29 (-1.80)			0.76 (4.93)	0.833	20.9

Notes: Equations estimated with a Cochraine-Orcutt iterative procedure to correct for serial correlation; R^2 (adj) is the adjusted (for degrees of freedom) coefficient of determination; F is the F-statistic; ( ) is the t-statistic of significance. All variables are defined in terms of their percentage of total (actual) government expenditures. The unexpected deficit is the difference between the actual deficit and that projected at the beginning of the fiscal year. Expected expenditures are those projected at the beginning of the fiscal year. The deficit is defined as expenditures minus revenues. Positive numbers therefore signify that a larger deficit increases budgetary shares.

TABLE A-3

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Human Resource Development, Health and Social Development

(standardized regression coefficients)

Category

	Fiscal Measure				Statistics	
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues	R^2 (adj)	F
Human Resource Development						
(1)	0.74 (3.81)				0.732	22.9
(2)	0.99 (4.88)	0.36 (1.92)			0.805	17.5
(3)		-0.02 (-0.12)	0.85 (4.88)		0.805	17.5
(4)			1.00 (6.02)	0.27 (1.66)	0.866	26.9
(5)	0.72 (3.40)			-0.08 (-0.40)	0.697	10.2
Health and Social Development						
(6)	0.67 (2.55)				0.495	8.8
(7)	0.74 (2.15)	0.11 (0.35)			0.501	3.9
(8)		-0.17 (-0.63)	0.63 (2.17)		0.433	3.9
(9)			1.03 (4.28)	0.60 (2.58)	0.707	10.6
(10)	0.72 (2.63)			0.24 (0.90)	0.480	4.7

Notes: Equations estimated with a Cochraine-Orcutt iterative procedure to correct for serial correlation; R^2(adj) is the adjusted (for degrees of freedom) coefficient of determination; F is the F-statistic; ( ) is the t-statistic of significance. All variables are defined in terms of their percentage of total (actual) government expenditures. The unexpected deficit is the difference between the actual deficit and that projected at the beginning of the fiscal year. Expected expenditures are those projected at the beginning of the fiscal year. The deficit is defined as expenditures minus revenues. Positive numbers therefore signify that a larger deficit increases budgetary shares.

TABLE A-4

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Defense, Government Lending

(standardized regression coefficients)

Category

	Fiscal Measure				Statistics	
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues	R^2 (adj)	F
Defense						
(1)	0.45 (1.35)				0.166	2.6
(2)	0.24 (0.59)	-0.33 (-083)			0.171	1.6
(3)		-0.42 (-1.28)	0.20 (0.59)		0.127	1.7
(4)			0.90 (4.23)	1.00 (4.72)	0.761	13.7
(5)	0.64 (2.58)			0.67 (2.75)	0.569	6.3
Government Lending						
(6)	-0.59 (-2.18)				0.221	3.3
(7)	-0.92 (-4.88)	-0.77 (-3.34)			0.679	9.5
(8)		-0.41 (-2.03)	-0.78 (-4.88)		0.681	9.6
(9)			-0.40 (-2.76)	0.55 (3.22)	0.789	16.0
(10)	-0.36 (-2.75)			0.67 (4.68)	0.782	15.3

Notes: Equations estimated with a Cochraine-Orcutt iterative procedure to correct for serial correlation; R^2(adj) is the adjusted (for degrees of freedom) coefficient of determination; F is the F-statistic; ( ) is the t-statistic of significance. All variables are defined in terms of their percentage of total (actual) government expenditures. The unexpected deficit is the difference between the actual deficit and that projected at the beginning of the fiscal year. Expected expenditures are those projected at the beginning of the fiscal year. The deficit is defined as expenditures minus revenues. Positive numbers therefore signify that a larger deficit increases budgetary shares.

TABLE A-5

Saudi Arabia: Fiscal Budgetary Impact (1979-1988)
Administration, Subsidies

(standardized regression coefficients)

Category

| | Fiscal Measure | | | | Statistics | |
	Unexpected Deficit	Expected Deficit	Actual Deficit	Expected Revenues	R^2 (adj)	F
Administration						
(1)	0.37 (1.82)				0.530	10.0
(2)	0.26 (1.08)	-0.24 (-0.86)			0.506	5.1
(3)		-0.34 (-1.36)	0.22 (1.08)		0.507	5.2
(4)			0.59 (3.07)	0.55 (2.51)	0.688	9.8
(5)	0.49 (2.54)			0.34 (1.66)	0.624	7.7
Subsidies						
(6)	0.05 0.22				0.634	15.4
(7)	-0.06 (-0.15)	-0.09 (-0.32)			0.591	6.8
(8)		-0.06 (-0.04)	-0.05 (-0.02)		0.597	6.8
(9)			0.10 (0.32)	0.33 (1.48)	0.693	10.0
(10)	-0.06 (-0.28)			0.32 (1.57)	0.692	10.0

Notes: Equations estimated with a Cochraine-Orcutt iterative procedure to correct for serial correlation; R^2(adj) is the adjusted (for degrees of freedom) coefficient of determination; F is the F-statistic; ( ) is the t-statistic of significance. All variables are defined in terms of their percentage of total (actual) government expenditures. The unexpected deficit is the difference between the actual deficit and that projected at the beginning of the fiscal year. Expected expenditures are those projected at the beginning of the fiscal year. The deficit is defined as expenditures minus revenues. Positive numbers therefore signify that a larger deficit increases budgetary shares.

REFERENCES

Caiden, N., and Wildavsky, A., 1974, *Planning and Budgeting in Poor Countries*, New York, John Wiley.

Economist Intelligence Unit, 1989, *Saudi Arabia: Country Report*, London, Economist Intelligence Unit, No. 1, p. 3. ~

Encarnacion, J., 1970, "Some Implications of Lexicographic Utility in Development Planning", *The Philippine Economic Journal*, Second Semester, pp. 231-240.

Hicks, N., and Kubisch A., 1984, "Cutting Government Expenditure in LDC", *Finance and Development*, September, pp. 37-39.

Looney, R., 1990, *Economic Development in Saudi Arabia: Consequences of the Oil Price Decline*, Greenwich, CT, JAI, Press, chp. 11.

Wilson, R., *Gulf Trade and Finance: Trends and Market Prospects*, London, Graham & Trotman, p. 93.

World Bank, 1981, *World Development Report, 1981*, New York, Oxford University Press, pp. 97-98.

(1983a), *Focus on Poverty, 1983*, p. 5.

(1983b), *IDA in Retrospect*, Washington, The World Bank, p. 52.

(1983c), *Sub-Saharan Africa: Progress Report on Development Prospects and Programs*, Washington, The World Bank, p. 30.

(1984), *World Bank Program on Special Assistance to Member Countries*, Washington, The World Bank, p. 1.

(1988), *Special Indicators of Development, 1988*, Washington, The World, Bank, p. 209.

(1989), *Social Indicators of Development, 1989*, Baltimore, The Johns Hopkins University Press, p. 264.